WHAT IS CLAIMED IS:

1. A method of manufacturing a rotor of an electric motor having a motor housing, a rotating shaft rotationally supported by the motor housing, and a rotor supported by the rotating shaft, wherein the rotor comprises an inner core fixed to the rotating shaft, and a coil unit having multiple outer cores, bobbins provided on the outer cores and windings respectively wound on the bobbins, wherein the method comprises;

a step of measuring weight parameter of at least one of the outer cores, bobbins and windings;

a step of stratifying at least one of the outer cores, bobbins and windings depending on the weight parameter into a predetermined number of groups, wherein each of the groups has a weight parameter range;

a step of preparing a set of coil units, which has a certain number of outer cores, bobbins and windings, wherein at least one of outer cores, bobbins and windings are picked out from one of the stratified groups; and

a step of assembling the set of coils unit to the inner core.

2. A method of manufacturing a rotor according to Claim 1, wherein in the stratifying step,

the weight parameter of the outer cores is measured and the outer cores are stratified into the predetermined number of groups depending on the measured weight parameter, and

the weight parameter of winding units comprising the bobbins

and the windings wound on the bobbins is measured and the winding units are stratified into the predetermined number of groups depending on the measured weight parameter.

3. A method of manufacturing a rotor according to Claim 1, wherein in the stratifying step, the weight parameter of the coil unit is measured and the coil units are stratified into the predetermined number of groups depending on the measured weight parameter.

4. A method of manufacturing a rotor according to one of Claims 1 to 3,

wherein the outer core comprises multiple outer core pieces made from metal sheet by a punch-out process and a number of outer core pieces are laminated, and

wherein the number of lamination of the outer core pieces is decided based on the measured thickness.

5. A method of manufacturing a rotor according to Claim 1,

wherein the outer core comprises multiple outer core pieces made from metal sheet by a punch-out process and a number of outer core pieces are laminated, and

wherein the weight parameter is a thickness of the metal sheet, so that the thickness of the metal sheet is measured and the number of lamination of the outer core pieces is decided based on the measured thickness.

6. A method of manufacturing a rotor according to one of

Claims 1 and 3,

wherein the outer core comprises multiple outer core pieces made from metal sheet by a punch-out process and a number of outer core pieces are laminated, and

wherein the weight parameter is a length of the laminated outer cores and a number of outer core pieces forming the outer core, so that the outer cores are stratified into the groups based on the measured length of the laminated outer cores and the measured number of the outer core pieces.

7. A method of manufacturing a rotor of an electric motor having a motor housing, a rotating shaft rotationally supported by the motor housing, and a rotor supported by the rotating shaft, wherein the rotor comprises an inner core fixed to the rotating shaft, and a coil unit having multiple outer cores, bobbins provided on the outer cores and windings respectively wound on the bobbins, wherein the method comprises;

a step of forming outer core pieces from metal sheet;

a step of measuring a thickness of the metal sheet and deciding a number of lamination of outer core pieces;

a step of laminating the decided number of outer core pieces to form the outer core;

a step of measuring weight of the outer cores;

a step of stratifying the outer cores into a predetermined number of outer core groups, wherein each of the groups has a weight range;

a step of forming a winding unit, wherein the winding is formed

on the bobbin;

a step of measuring weight of the winding units;

a step of stratifying the winding units into a predetermined number of winding unit groups, wherein each of the groups has a weight range;

a step of preparing a set of coil units, which has a certain number of outer cores and winding units, wherein the outer cores and winding units are respectively picked out from one of the outer core groups and one of the winding unit groups; and

a step of assembling the set of coils unit to the inner core.

8. A method of manufacturing a rotor of an electric motor having a motor housing, a rotating shaft rotationally supported by the motor housing, and a rotor supported by the rotating shaft, wherein the rotor comprises an inner core fixed to the rotating shaft, and a coil unit having multiple outer cores, bobbins provided on the outer cores and windings respectively wound on the bobbins, wherein the method comprises;

a step of making outer core pieces from metal sheet by a punch-out process;

a step of measuring a thickness of the metal sheet and deciding a number of lamination of the outer core pieces;

a step of laminating the number of outer core pieces to form the outer core having a predetermined length; and

a step of stratifying the laminated outer cores depending on the lamination number into a predetermined number of groups;

a step of preparing a set of coil units, which has a certain

number of outer cores, bobbins and windings, wherein the certain number of outer cores are picked out from one of the groups; and

a step of assembling the set of coil units to the inner core.

9. A method of manufacturing a rotor of an electric motor having a motor housing, a rotating shaft rotationally supported by the motor housing, and a rotor supported by the rotating shaft, wherein the rotor comprises an inner core fixed to the rotating shaft, and a coil unit having multiple outer cores, bobbins provided on the outer cores and windings respectively wound on the bobbins, wherein the method comprises;

a step of making outer core pieces from metal sheet by a punch-out process;

a step of laminating a number of outer core pieces to form the outer core;

a step of measuring a length of the laminated outer cores and a number of outer core pieces forming the outer core;

a step of stratifying the laminated outer cores depending on the length and lamination number of the laminated outer cores into a predetermined number of groups;

a step of preparing a set of coil units, which has a certain number of outer cores, bobbins and windings, wherein the certain number of outer cores are picked out from one of the groups; and

a step of assembling the set of coil units to the inner core.

10. A method of manufacturing a rotor of an electric motor having a motor housing, a rotating shaft rotationally supported by

the motor housing, and a rotor supported by the rotating shaft, wherein the rotor comprises an inner core fixed to the rotating shaft, and a coil unit having multiple outer cores, bobbins provided on the outer cores and windings respectively wound on the bobbins, wherein the method comprises;

a step of measuring weight of the coil units;

a step of stratifying the coil units depending on the weight of the coil units into a predetermined number of groups, wherein each of the groups has a weight range;

a step of preparing a set of coil units, which has a certain number of outer cores, bobbins and windings, and which are picked out from one of the groups; and

a step of assembling the set of coil units to the inner core.

11. A method of manufacturing a rotor according to one of Claims 7 and 10, wherein a width of the weight range of a group is made larger than that of the weight range of the other groups.

12. A method of manufacturing a rotor according to one of Claims 7 and 10, wherein a width of the weight range of the groups at both ends of a normal distribution is made larger than that of the weight range of the groups close to a center of the normal distribution.

13. A method of manufacturing a rotor according to one of Claims 1, and 7 to 10,

wherein the bobbin comprises:

a hollow base and a first and second flanges respectively

formed at both ends of the hollow base, the hollow base and flanges forming a winding space having a trapezoidal cross section in a longitudinal direction, and a height of the trapezoid becoming smaller from the second flange towards the first flange;

wherein a wire will be wound on the bobbin in such a manner that a winding point of the wire reciprocally moves back and forth between the first and second flanges to form an inner layer of the winding until a height of the inner layer reaches a height of the first flange; and

wherein the wire will be further wound on the inner layer to form an outer layer thereon in such a manner that when the winding point comes to a first turning point on a way from the second flange towards the first flange, a winding direction will be turned at the turning point.

14. A method of manufacturing a rotor according Claim 13, wherein the wire will be further wound in such a manner that when the winding point comes to a second turning point on a way from the second flange towards the first flange, a winding direction will be turned at the second turning point, and

wherein the first and second turning points are positioned at positions which are almost on the same points in a circumferential direction.

15. A method of manufacturing a rotor according to one of Claims 1, and 7 to 10, wherein a predetermined number of coil units are fixed to the inner core in such a manner that the coil units

are arranged at an equal distance in a circumferential direction.

16. A method of manufacturing a rotor according to one of Claims 1, and 7 to 10, wherein the electric motor is used for a fuel pump having a housing rotationally supporting the rotor therein, and a fuel passage is formed between the outer surface of the rotor and the inner surface of the housing.

17. A method of manufacturing a rotor according to one of Claims 1, and 7 to 10, wherein the electric motor is used for a fuel pump having a housing rotationally supporting the rotor therein, and a fuel passage is formed between the outer surface of the rotor and the inner surface of the housing, and

wherein the outer surface of the rotor is formed by at least one the outer cores and the bobbins.

18. A method of manufacturing a rotor according to one of Claims 1, and 7 to 10,

wherein the electric motor is used for a fuel pump which comprises:

a housing rotationally supporting the rotor therein;

a pair of brushes movably disposed in the housing;

a commutator fixed to the rotor and electrically connected to the rotor, the commutator also having multiple segments operatively connected to the brushes, the commutator further having commutator terminals electrically connected at one ends to the segments; and

winding unit terminals projected from the bobbins and

electrically connected at one ends to the windings wound on the bobbins, wherein the other ends of the winding unit terminals being electrically connected to the other ends of the commutator terminals.

19. A method of manufacturing a rotor according to one of Claims 1, and 7 to 10,

wherein the electric motor is used for a fuel pump which comprises:

a housing rotationally supporting the rotor therein;

a pair of brushes movably disposed in the housing; and

a commutator fixed to an outer peripheral portion of a side surface of the bobbins.